

Appl. No. : 10/666,835
Filed : September 19, 2003

AMENDMENTS TO THE CLAIMS

1. (Cancelled)

2. (Currently Amended) The variable optical attenuator according to claim 3, wherein said first optical part or said second optical part is an optical fiber.

3. (Currently Amended) A variable optical attenuator comprising:

a first optical part;

a second optical part opposed to said first optical part with a predetermined gap therebetween; and

optical coupling efficiency adjusting means for adjusting a coupling efficiency between said first optical part and said second optical part while maintaining light propagating between said first optical part and said second optical part point-symmetric in mode field shape, wherein

said optical coupling efficiency adjusting means adjusts the coupling efficiency between said first optical part and said second optical part for an adjustment in light power,

The variable optical attenuator according to claim 1, wherein said optical coupling efficiency adjusting means includes:

a lens system arranged between said first optical part and said second optical part so that an optical axis thereof coincides with those of said first and second optical parts; and

moving means for relatively moving a lens constituting said lens system along the direction of the optical axes of said first and second optical parts with respect to said first and second optical parts.

4. (Original) The variable optical attenuator according to claim 3, wherein:

said lens system is composed of a first lens and a second lens arranged with a predetermined gap therebetween along the direction of the optical axes of said first and second optical parts; and

said moving means moves said first lens and said second lens in opposite directions by the same amount at the same time.

Appl. No. : 10/666,835
Filed : September 19, 2003

5. (Original) The variable optical attenuator according to claim 3, wherein said lens system is composed of a single lens.

6. (Original) The variable optical attenuator according to claim 3, wherein said moving means moves said lens constituting said lens system with an electromagnetic force or an electrostatic force.

7. (Original) The variable optical attenuator according to claim 3, wherein:

 said lens constituting said lens system is erected upright on a semiconductor substrate via a hinge; and

 said lens and said hinge are formed by using semiconductor microfabrication technology.

8. (Original) The variable optical attenuator according to claim 7, wherein said first optical part and said second optical part are fixed onto said semiconductor substrate.

9. (Currently Amended) A variable optical attenuator comprising:

a first optical part;

a second optical part opposed to said first optical part with a predetermined gap therebetween; and

optical coupling efficiency adjusting means for adjusting a coupling efficiency between said first optical part and said second optical part while maintaining light propagating between said first optical part and said second optical part point-symmetric in mode field shape,

wherein said optical coupling efficiency adjusting means adjusts the coupling efficiency between said first optical part and said second optical part for an adjustment in light power, and The variable optical attenuator according to claim 1,

 wherein, where said attenuator has an optical attenuation of 31.2 dB, polarization dependent loss of said attenuator is suppressed to 0.2 dB or less in a wavelength range of from 1530 nm to 1580 nm both inclusive.

10. (Currently Amended) A variable optical attenuator comprising:

a first optical part;

a second optical part opposed to said first optical part with a predetermined gap therebetween; and

Appl. No. : **10/666,835**
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optical coupling efficiency adjusting means for adjusting a coupling efficiency between said first optical part and said second optical part while maintaining light propagating between said first optical part and said second optical part point-symmetric in mode field shape,

wherein said optical coupling efficiency adjusting means adjusts the coupling efficiency between said first optical part and said second optical part for an adjustment in light power, and The variable optical attenuator according to claim 1,

wherein, where said attenuator has an optical attenuation of 30 dB, wavelength dependency of the optical attenuation is suppressed to 0.36 dB or less in a wavelength range of from 1530 nm to 1580 nm both inclusive.

11. (Original) The variable optical attenuator according to claim 3, wherein said moving means moves at least one of said first and second optical parts along the direction of the optical axis of said lens system.

12. (Original) The variable optical attenuator according to claim 11, wherein said lens system includes a first lens and a second lens arranged with a predetermined gap therebetween along the direction of the optical axis of said first and second optical parts; and

 said moving means moves said first and second optical parts in opposite directions by the same amount at a time.

13. (Original) The variable optical attenuator according to claim 12, wherein said moving means includes one of actuators for moving said first and second optical parts with an electromagnetic force or an electrostatic force and linear motors.

14. (New) The variable optical attenuator according to claim 9, wherein said first optical part or said second optical part is an optical fiber.

15. (New) The variable optical attenuator according to claim 10, wherein said first optical part or said second optical part is an optical fiber.